WATER TEMPERATURE MONITORING, 1997-1999

Methods: Water temperature data loggers were deployed at two stations in 1997 (North Boundary Station and Bottom of Project Station (Map 1). A third water temperature station was added in 1998 below the confluence of Crooked Creek. The objective of the third station was to accurately measure how the narrowing and deepening of the Wood River affects the rate of stream warming through the project reach.. Calibration and deployment of temperature loggers followed methods described in "Water Quality Monitoring Technical Guide Book, Oregon Plan for Salmon and Watersheds, 1999".

Results: Hourly recordings of instantaneous water temperatures were reduced to maximum daily water temperatures for the summer months of June, July, and August. Maximum daily air temperatures from the Chiloquin weather station were plotted along with water temperatures for 1997, 1998, and 1999 (figures 2-4). Table 1 shows the warming in degrees Fahrenheit that occurs over the length of the BLM property. The mean monthly stream warming is plotted in a bar graph for each year (figure 7). Maximum daily air temperatures from the Chiloquin weather station are plotted for reference (figure 6).

Table 7. Warming rates in project reach by summer month for 1997-1999.

Year	Mean warming June	Max June	Mean warming July	Max July	Mean warming August	Max August
1997	3.48	5.26	3.73	5.28	4.45	6.43
1998	5.67	7.12	8.51	11.81	5.20	8.28
1999	5.09	6.12	4.23	6.44	2.11	3.58

Because numerous physical climatological factors affect rates of stream warming, caution should be used in comparing differences between years. For the Wood River, ambient air temperature and flow weigh heavily in determining the rate of stream warming (interpreted from USGS SSTEMP model). Interpreting the Wood River data is further complicated by the fact that changes in channel surface area has occurred in stages (figure 1). The first major change in surface area occurred in October 1998 when surface area was reduced from 36 acres to 26 acres. The second change occurred in mid-July, 1999 when surface area was reduced from 26 acres to 17 acres. At such time that Wood River daily discharge information becomes available, it will be possible to verify how much of the change in warming rates can be attributed to changes in Wood River Surface area. Preliminary analysis of the 1998 data shows ambient stream and air temperatures and discharge rates can be modeled accurately to predict downstream water temperatures. A complete analysis of this model will be included in the 2001 annual monitoring report.

Figure 1. Graphic showing the change in water surface area after 1998 and 1999 re-construction.

	1997	1998	1999
AREA (sq.ft.)	1568154	1172112	714115
AREA (acres)	36.00	26.91	16.39

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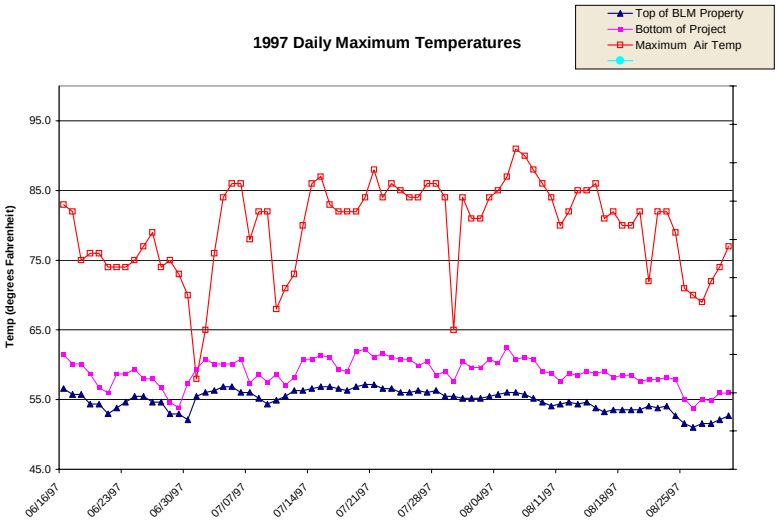
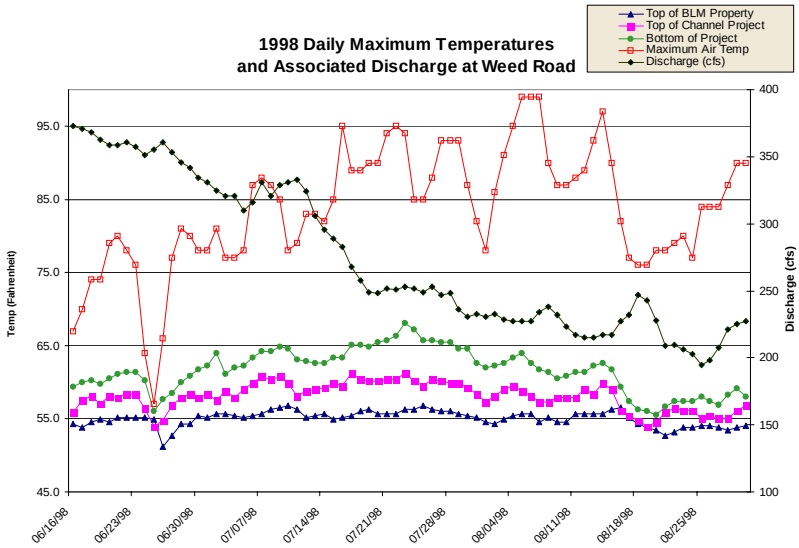


Figure 2



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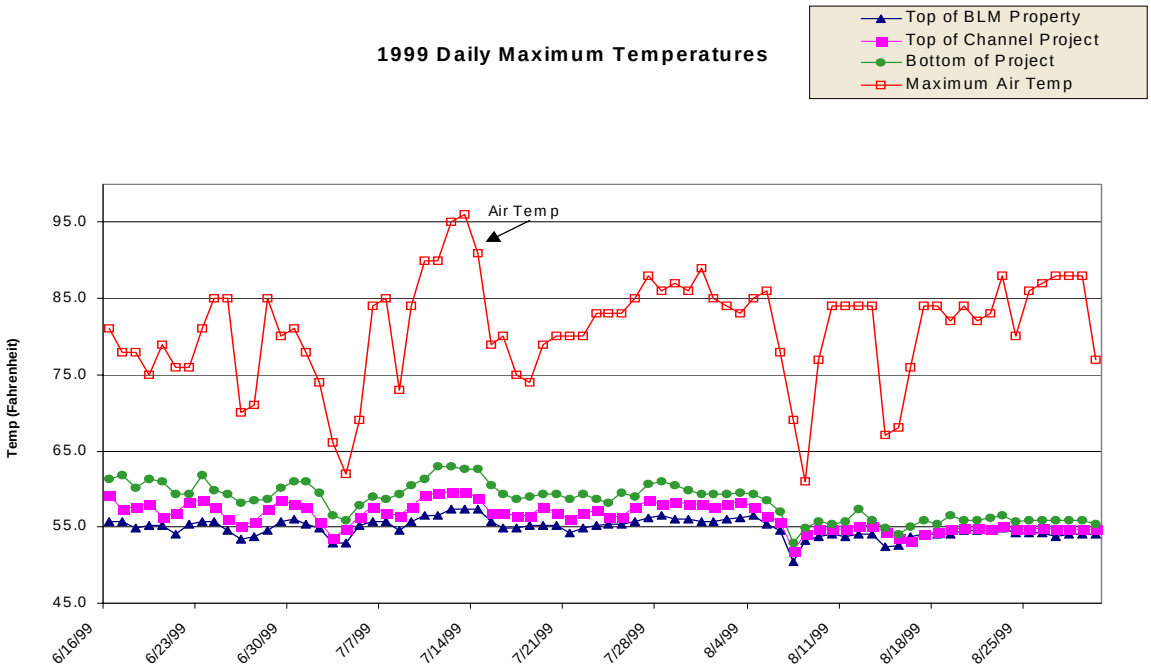

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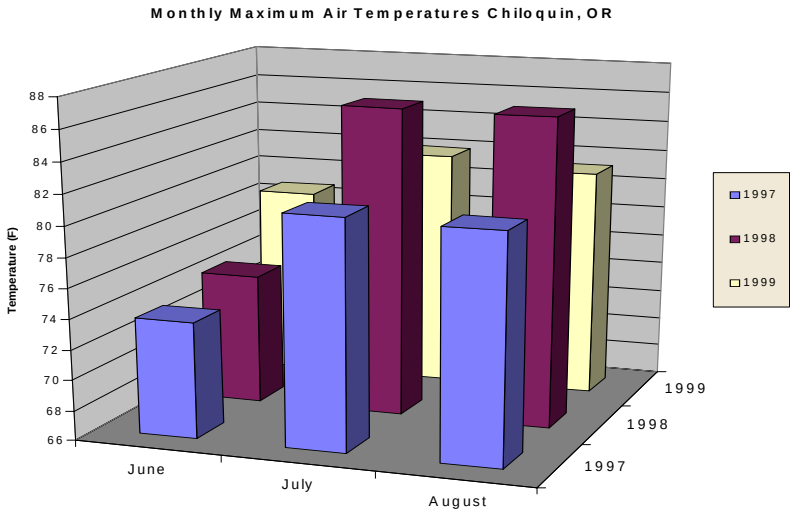

Figure 5.

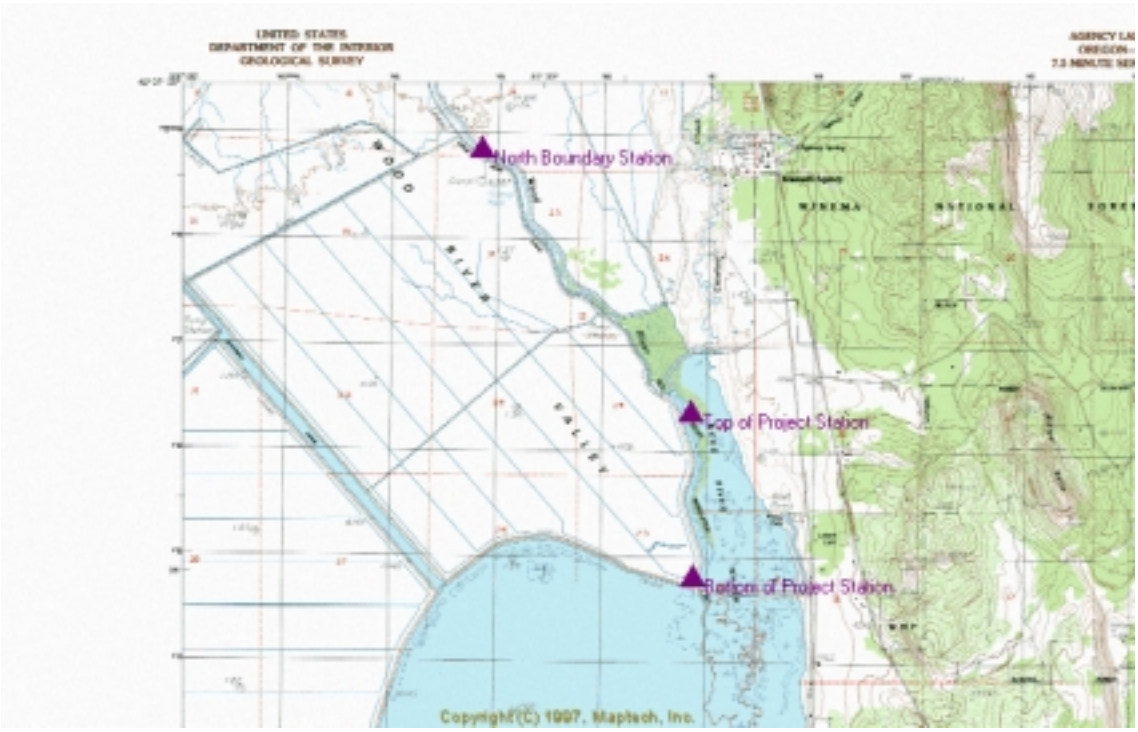

Figure 6. Location of temperature monitoring stations

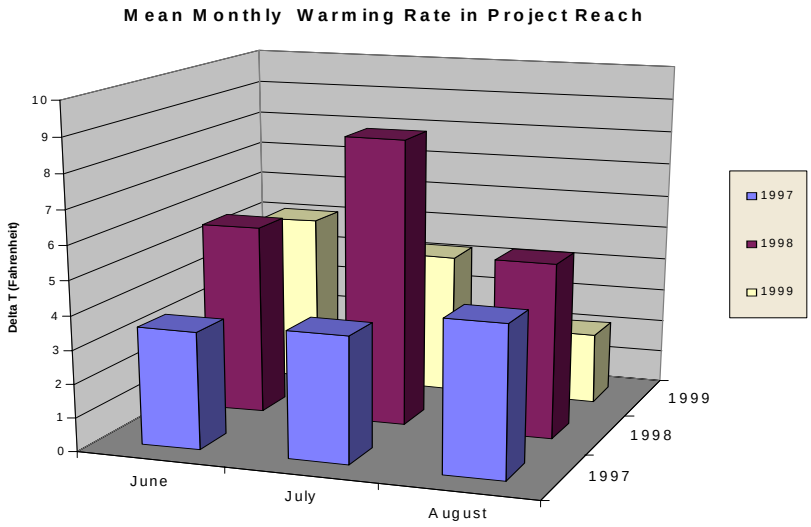

Figure 7.

Bars represent the average warming occurring in the summer through the project reach